See current for latest Rev/ver.

RELEASE BULLETIN
819-095000-313 Rev 01

latest 1985 = Rev 02

MSDOS Operating System **Model No.: APC-S02**

1.0 INTRODUCTION:

MSDOS is a single-user/single-task Disk Operating System for the APC computer. This release consists of two integrated parts; Version 2.11 of the Microsoft MSDOS Operating System and a set of IO driver software, called the IOSYS provided by NEC Information Systems. Together, these two parts form the operating system known as MSDOS 2.11 (001).

2.0 CONTENTS OF THE RELEASE:

2.1 Distribution Media

PART NO.	DESCRIPTION
819-076002-0200 Rev 01	MSDOS 2.11 System Diskette
819-076002-0201 Rev 01	MSDOS 2.11 List Diskette

2.2 Documentation

PART NO.	DESCRIPTION
819-000101-6001	MSDOS System User's Guide
819-000103-2001 Rev 01	MSDOS System Reference Guide
819-000104-3001	MSDOS System Programmer's Guide
819-095000-313 Rev 01	Release Bulletin
158-020000-142	Function Key Template
158-999000-189	GSX-86 User's Guide for MSDOS

3.0 HARDWARE/SOFTWARE REQUIREMENTS:

3.1 Minimum Hardware Requirements

APC-H01 - Monochrome APC with 1 diskette drive

3.2 Minimum Software Requirements

None

4.0 INSTALLATION PROCEDURE:

1) Refer to Chapter 2 of the MSDOS User's Guide for details on installing this release of MSDOS 2.11 (001).

2) Use TYPE to view the READ.ME file included with the MSDOS 2.11 System Diskette. This text file contains additional information that is not incorporated into the release bulletin.

5.0 ENHANCEMENTS:

1) Escape Sequence Enhancements

The following escape sequences have become available starting with MSDOS 2.11 (001). They are an addition to the set implemented by previous releases; all of the previous sequences that are documented in the MSDOS System Reference Guide remain valid.

Alternate Character Set Display. See chr.com

ESC (0 (Numeric zero not alphabetic "O")

This sequence selects the currently loaded alternate character set (RAM character generator) for display of all subsequent characters with codes in the range 20 (hex) to FF (hex).

ESC (B

This sequence selects the standard ASCII (ROM character generator) character set for display of all subsequent characters.

ESC {80h} 0

Initiates screen character dump to printer. "{80h}" is a single character with code 80 (hex). The CRTDUMP resident extension must be loaded. See the attached Operation of CRTDUMP section for details.

ESC {80h} 1

Initiates screen graphics dump to printer. "{80h}" is a single character with code 80 (hex). The CRTDUMP resident extension must be loaded. See the attached Operation of CRTDUMP section for details.

ESC {80h} 2

Initiates graphics memory dump to printer. "{80H}" is a single character with code 80 (hex). The CRTDUMP resident extension must be loaded. See the attached Operation of CRTDUMP section for details.

2) CONFIG TABLE ENTRIES

The CONFIG Table entries have been updated to include additional pointers to various items within the IOSYS. All Items in the CONFIG Table (from MSDOS 2.00 (000) prior to this release are still intact.

3) NMI Re-Boot Support

The NMI (Non Maskable Interrupt) switch located on the back of the APC Keyboard is now used as a RE-BOOT switch. The NMI interrupt vector has been set to vector into the BOOT-ROM start-up routine which initializes the CS,DS,ES, and SS registers to 0000H and then transfers control to the BOOT-ROM Start address. The FNC + CTRL + BREAK STOP Re-Boot operation is still functional, however, the NMI Re-Boot method can be used if the FNC + CTRL + BREAK STOP Re-Boot method fails.

4) Hard Disk Access Indicator

Since the APC Hard Disk Drives do not have a visible access indicator, an internal routine (switchable to off, visual or audible indication) is provided to indicate when Hard Disk accesses are occurring. The audible indicator is a simple bell tone; the visual indicator, the Hard Disk symbol, is displayed just to the right of the SP:9 display on the status line.

5) RAMDISK Support

A RAMDISK option is now supported for users who have an APC with 512K Bytes of RAM installed. The upper 256K bytes can be used for the RAMDISK (logical drive = M:) by simply using the RAMDISK Utility that is supplied with this release. Refer to the addendum of this release bulletin for more detail on the use of RAMDISK.

6) Relocation of Hard Disk Mode Flag

The Hard Disk White Mode flag has been moved into the IOSYS instead of CMOS. The mode is progammable to either BUFFERED or DIRECT and can be set by the HDMODE Utility provided with this release.

7) CRTDUMP

This program produces a printed copy of data that is presently displayed on the APC screen. Text and graphics can be printed on either an NEC PC-8023A (H16) or a P2/P3 Pinwriter, and text alone can be printed to any of the Spinwriter series. Once loaded, CRTDUMP remains resident in the system, and can be accessed by any of three methods: keyboard input, escape sequences, or

DDNECP2.SYS

assembler level software interrupt. It should be noted that CRTDUMP supports full graphics capability for serial (RS232) interfaced P2/P3 printers.

8) GSX-86

Digital Research's GSX-86, the Graphics System Extention for the CP/M-86 operating system, is now standard on the NEC APC under MSDOS. This implementation replaces the PASCAL graphics routines offered previously. Refer to the GSX User's Guide for details on operation.

9) PINWRITER Driver (DDNECP2.SYS)

This file is a device driver for the P2 Pinwriter dot matrix printer. Programs that are written for use with GSX-86 can now produce printed output directly. (Previously, graphic output had to be drawn on the APC screen and copied to the printer using the CRTDUMP Utility.) Using this driver, high resolution output, scaled to fill the entire printer page, can be generated.

10) Hard Disk Backup and SLAVE HARD DISK SUPPORT

Support for the H-27 Slave Hard Disk has been added to the IOSYS. The Master Hard Disk and the Slave Hard disk each support 4 online/mounted volumes. The logical drive names for the Master are E:, F:, G:, and H:, and the logical drive names on the Slave are I:, J:, K:, and L:. The HDFORMAT Utility now supports the Slave drive. The HDBACKUP Utility is now part of this release. Refer to the addendum of this release bulletin for details concerning the HDFORMAT and HDBACKUP Utilities.

11) Auto Memory Sizing

Automatic memory sizing that works in conjunction with the RAMDISK option has been included in this release of MSDOS. When RAMDISK is turned on, the upper 256k bytes of 512k Bytes is used for the RAMDISK and Auto memory sizing is turned off. Refer to the description of the RAMDISK Utility for more details regarding the use of the RAMDISK option.

12) CHR Utility

The CHR Utility included with this release of MSDOS has been enhanced to accept the name of an input file on the command line. This allows the CHR Utility to be used in a batch file. The name of the command file must conform to standard filename syntax.

13) KEY Utility

The KEY Utility included with this release of MSDOS has been enhanced to accept the name of an input file on the command line. This allows the KEY Utility to be used in a batch file. The name of the command file must conform to standard filename syntax.

14) ALT Key

The ALT key now selects the alternate character set. With ALT latched in the down position, all characters displayed will be from the currently loaded alternate character set. Unlatching the ALT key will resume display of characters from the ROM (standard ASCII) character generator.

15) H14 Support

Support of the H14 optional serial interface is provided in this release of MSDOS as device AUX2

16) HDFORMAT

HDFORMAT has been enhanced to support an APC that has either an H-26 or both an H-26 and an H-27 (master and slave Hard Disk Drives). Refer to the Addendum for more information regarding the use of HDFORMAT.

17) FORMAT

The FORMAT Utility no longer needs to have a bootable diskette inserted into the current default diskette drive in order to format another diskette when the "/S" option is included in the command line. The only requirement for the FORMAT Utility in this release is to have the IO.SYS, MSDOS.SYS and COMMAND.COM files present in the root directory of the current default drive when the "/S" option is used. This may be accomplished by using the GETSYS Utility. Refer to the addendum of this release bulletin for more information on the use of the GETSYS Utility.

18) Floppy Drive Configuration

A new utility called SETFLOP has been included with this release of MSDOS 2.11. SETFLOP allows the user to easily configure an APC system as either a Single Drive or a Dual Drive system. Refer to the addendum for more details on SETFLOP.

19) SETCOM UTILITY

A new SETCOM Utility has been included with this release of MSDOS 2.11 that replaces the previous version of SETCOM. Functionality to initialize the optional serial port (H-14) has also been included.

20) INT 220 - Function 11

The interrupt 220 Extended IOSYS function now includes support for initializing the Optional Serial interface (H-14). Refer to the Addendum for more details.

config.doc

6.0 CAUTIONS and RESTRICTIONS:

1) Use the TIMERON and TIMEROFF Utilities when running any communications software that supports interrupts.

2) Keyboard repeat does not work when the timer is turned off.

3) The RDCPM utility can be used only to read diskettes formatted under a CP/M operating system. Attempting to perform a RDCPM operation from a MSDOS diskette will cause unpredictable results. RDCPM only reads single sided single density CP/M-86 or CCP/M-86 diskettes. Attempting to read a double sided double density diskette causes an error. Using RDCPM with "wildcard" file name specifications causes unpredictable results.

4) To make a bootable MSDOS disk, the /S switch of the FORMAT command must be used when formatting a new diskette.

5) Note that execution of the HDFORMAT utility resets the working directories for each hard disk volume to the root directory. For example, say you have set the working directory on drive F: to F:\JOHN\DATA with a CD command, and then execute HDFORMAT. When you leave HDFORMAT, the CD on drive F: will be F: \(the root directory), and you will need to re-issue the CD command if you wish to make F:\JOHN\DATA the working directory again.

6) All unused interrupt vectors are preset so that an interrupt request via an unused vector will display the message "Interrupt Trap Halt", followed by the current register and status information. Re-booting the system is necessary once this message is displayed.

7) The LIB library manager provided with this release does not accept pathnames (files outside the working directory.)

8) MSDOS V2.11 allows certain systems operating parameters to be modified from the default values via a file called CONFIG.SYS. If a file with this name is present on the boot volume, then it is read at boot time, and system parameters are set according to the commands found in the file. For further information on the use of CONFIG.SYS, see the file CONFIG.DOC, which is supplied on the List Diskette.

9) The following changes regarding information given in Appendix A of the MSDOS User's Guide _Files Supplied on the MSDOS Diskette_, should be noted:

a) The DOCU directory is not supplied on the System Diskette. Files from this directory are now supplied on the List Diskette.

b) View the READ.ME file for a complete list of files included on the release bulletin.

10) Some graphics applications may require more than 128K bytes of system RAM. Results are unpredictable when the application size exceeds the available user RAM area of the system. CHKDSK may be used to determine the available RAM area before attempting to load and execute your application.

11) Graphics (GSX) when loaded, does not check for the existence of graphics hardware. Graphics will load successfully, but fail when the graphics applications is executed if graphics hardware is not installed.

12) When a serial interface printer is used on the standard or optional serial interfaces of the APC a standard modem eliminator or similar wiring interface is necessary to couple the APC to the serial interface printer (e.g. P2/P3).

13) Utilities from previous releases can not in all cases be used with this release of MSDOS 2.11. It is strongly recommended not to use utilities from previously released versions of MSDOS with this release.

14) The GET TIME function of MSDOS always returns 00 for the 1/100's position.

15) Parameters that are set by SETCOM or by INT 220 functins 10 and 11 are the only ones that can be read/returned by SETCOM as the current settings. Parameters that are sent directly to the 8251's on the standard serial port or the H-14 can not be returned by SETCOM.

16) MSDOS error messages will be displayed in the current alternate character set when either the "ALT" key is latched in the down position or the alternate character set has been selected by issuing the "ESC"(0 escape sequence. To recover from this condition the "ALT" key must be unlatched and/or the "ESC" (B escape sequence must be issued.

17) To avoid fencing memory it is recommended to load CRTDUMP before any other applications (including GSX).

7.0 PROBLEMS FIXED:

1) AUTO Disk Logging

Auto disk logging now operates when the timing interrupt is turned off.

2) Software Driven CRT DMA

The DMA access to the CRT character area controlled by the Character GDC through INT 220 is implemented in software to avoid DMA channel interference and also to enhance the speed of the DMA transfer of character data to the CRT screen.

3) INT 220 (Interrupt State)

INT 220 in this release correctly preserves the interrupt status.

4) Hard Disk Buffer Flush

The previous release of MSDOS did not allow the user to easily select/change the BUFFERED/DIRECT mode for Hard Disk buffer flushes. A Utility (HDMODE) has been added to manage the MODE selection and the BUFFERED/DIRECT flag has been moved into the IOSYS configuration area.

5) Color Specification by ESC sequence

The previous release of MSDOS produced the incorrect colors for Purple and Light Blue when the corresponding ANSI Standard ESC sequences were used. This release corrects this problem by reversing the color attribute values within the IOSYS.

6) Incorrect key code for "^" (unshifted)

The "^" keycode (unshifted) has been changed to be 03H (CTRL + C).

7) Keyboard FIFO Clear upon CTRL Code.

When CTRL + S, CTRL + C, or CTRL + F are pressed the keyboard FIFO buffer is automatically cleared. This allows the system to recognize a CTRL + S,C or F at the time they are typed instead of processing all of the keystrokes in the keyboard FIFO buffer before recognizing the CTRL code. CTRL + F is provided explicitly as a means of canceling unprocessed keystrokes in the FIFO buffer.

8) Keyboard Interrupt during Keyboard Disable

Keyboard Interrupt FNC + CTRL + BREAK STOP are no longer recognized when the Keyboard is disabled. The user can not reboot the system by FNC + CTRL + BREAK STOP until a Keyboard enable ESC sequence has been issued. Other keycodes will also be ignored as normal during the Keyboard disable period.

9) INTERRUPT 29H restores old interrupt status

The Interrupt 29H handler for higher speed console output has been modified to automatically recover the Interrupt Enable/Disable status of the calling routine. This means that the application or user can determine whether or not the interrupts will be enabled or disabled when INT 29H is in effect.

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ADDENDUM

To

Chapter 4 of MSDOS User's Guide

COUNTRY Command

Syntax:

```
COUNTRY [ <country> | def ]
```

Type:

External

Function:

COUNTRY is a utility that allows the user to change the codes that the MSDOS IOSYS interprets and generates from the keyboard.

Comments:

COUNTRY can be menu operated or used as a single command. Once a valid country has been selected, the IOSYS will reflect the changes until a new country is defined. If the system is rebooted, the country definition is lost and defaults to U.S.A. until COUNTRY DEF is executed or a new country is selected from the menu or command line. For this reason, the command COUNTRY DEF is placed in the AUTOEXEC.BAT file and will initiate the selected country each time the system is rebooted.

Operation

Menu method

Menu selections are displayed in Figure 1. as they appear in the COUNTRY menu. (Note that AUSTRAL stands for Australia). This menu is displayed when the COUNTRY utility is executed without a valid parameter. A valid number and a successful loading of the country definition returns the user to the A> prompt. Type CTRL+C or the number of the currently selected (highlighted) country to abort the COUNTRY command.

Figure 1.

```
COUNTRY VER 1.12

      * * * COUNTRY SELECT * * *

1.  AUSTRAL
2.  FRANCE
3.  GERMANY
4.  NORWAY
5.  SPAIN
6.  SWEDEN
7.  U.K.
8.  U.S.A.


KEY IN NUMBER OF COUNTRY (1-8):_
```

Command Line Entry

The COUNTRY utility can be executed as a command by typing COUNTRY followed by a single option:

```
     COUNTRY [country name] <ret>
```

Valid selections are the country names that appear in the menu. Note that they should be typed as they appear in the menu, including periods. It does not matter if the name is in upper or lower case. An invalid name (if you typed COUNTRY USA, for example) will display the menu (see Figure 1.) and then the proper country can be selected by number.

Notes on Printers when COUNTRY is used

The auxiliary characters make up the special character set that is used for the individual country definitions. The auxiliary characters are composed of 16 dots by 8 dots in a matrix. For thimble-type printers, such as the SPINWRITER series, 3530 and 7730, the special codes in the auxiliary character set have no meaning and are replaced by a space. The 8023 Dot matrix printer and P2/P3 PINWRITER are capable of interpreting the auxiliary character codes and will print a dot representation of the auxiliary character. The PRINTER Utility is used to select which printer type is used as the system printer.

SETCOM Command

Syntax:

```
setcom [ <speed>, <length>, <parity>, <stop bits> [/H14] [/Perm] ]
```

where:

<speed> is 150 200 300 600 1200 2400 4800 9600 or 19200 baud
<length> is 5 6 7 or 8
<parity> is o e or n
<stop bits> is 1, 1.5 or 2

Type:

External

Function:

SETCOM is used to configure the standard RS-232 or optional (H14) serial interface.

Comments:

If all parameters are omitted, then the current settings for the ports will be displayed; if no H14 is present, then "There is no H14 serial expansion port option installed" will be displayed.

The /Perm option causes both the 8251 registers and IO.SYS file to be modified; otherwise, only the 8251 registers are modified.

The /H14 option is used to specify parameters for the H14.

The syntax of the command adheres to the documented conventions of the previous release; batch files which issue a SETCOM should still function correctly, without modification.

CRTDUMP Command:

Syntax:

```
CRTDUMP
```

Type:

External

Function:

CRTDUMP is a utility that allows the user to copy data on the APC screen to a printer. The data copied can be text or graphics, and the graphic copy can be either what is on the screen or a dot representation of the graphic memory. CRTDUMP, when loaded, becomes a resident system utility, and can be executed at any time, even from a user program.

Comments:

From the MSDOS prompt, the user issues the command

```
CRTDUMP
```

to load the utility. The program responds with

```
CRTDUMP now loaded.
```

At this point, the program becomes part of the system itself, and remains there until the system is rebooted. At load time, CRTDUMP will determine the type of screen [graph or non-graphic, mono or color], the printer type [8023, P2/P3 Pinwriter, Spinwriter, or other]. and the output port used [parallel, serial, or H14 optional serial port] based on what has been configured with the CRTTYPE and PRINTER Utilities.

If changes are made to any of these configured items [screen type, printer type, or printer port], CRTDUMP will not recognize the changes until the program is re-initialized. This is done by entering the command

```
CRTDUMP
```

from the MSDOS prompt. The program will then respond with

```
CRTDUMP already loaded, variables reinitialized.
```

Any changes to the configured items that have been made will now be incorporated into CRTDUMP.

CRTDUMP EXECUTION:

The CRTDUMP extension can be invoked from the keyboard, through the use of system calls, or CRT escape sequences. The following table describes each access method:

	KEYBOARD	INT221	ESC SEQUENCE
CHARACTER DUMP:	CTRL + PRINT	CL = 0	ESC 80H '0'
CRT GRAPHIC DUMP:	FNC + PRINT	CL = 1	ESC 80H '1'
GRAPHIC MEMORY DUMP	FNC+CTRL+PRINT	CL = 2	ESC 80H '2'

RESTRICTIONS:

On the 8023 and P2/P3 Pinwriter printers, auxiliary characters are printed as they appear on the APC screen. In the case of the 8023, however, every other line of an auxiliary character is printed. Some auxiliary characters may therefore appear to be broken or distorted due to the mechanical limitations of the 8023 printer.

Only the 8023 and P2/P3 Pinwriter printers support graphic and auxiliary character dumps. All other printers will not produce output for graphic dumps, and will substitute spaces for any auxiliary characters.

Since the P2/P3 Pinwriters come in a serial as well as a parallel interface configuration, CRTDUMP includes functionality to support both. To support the serial interface type pinwriter a modem eliminator or equivalent may be necessary between the APC and the P2/P3 Pinwriter.

HDIND Command

Syntax:

```
HDIND [ [ audible | visual | off ] [/Perm] [/Nomem] ]
```

Type:

External

Function:

This utility is used to select the Hard Disk Indicator function and type.

Comments:

The indicator can be set to either audible, visual or off. The visual indication is given on the status line immediately to the right of the "SP:x" display. The audible indicator is given by a short bell signal (the volume adjustment must be set high enough to hear the tone).

The change can be made permanent by selecting the /Perm option (permanent means that the IO.SYS file on disk is modified). The change is always made to the memory image of the IO.SYS (and therefore is effective immediately) unless the /Nomem option is used in the command line. Typing the command followed by no options will display the current state of the Hard Disk Indicator.

CRTTYPE Command

Syntax:

```
CRTTYPE   [ [ color | mono ]  [ graphics | nographics ]
          [/Perm][/Nomem] ]
```

Type: 5/18/85 I changed it to mono nographics

External

Function:

This Utility is used to set or check the CRT TYPE byte that is set in IOSYS and used in conjunction with CRTDUMP.

Comments:

Issuing the command without any options will result in the display of the current status of the byte in IOSYS. The status is shown as:

1. mono/color
2. graphics/nographics

The change can be made permanent by selecting the /Perm option (permanent means that the IO.SYS file on disk is modified). The change is always made to the memory image of the IO.SYS unless the /Nomem option is used in the command line. Typing the command followed by no options will display the current state of the CRTTYPE byte.

HDMODE Command

Syntax:

```
HDMODE [ buffered | direct ] [/Perm] [/Nomem]
```

Type:

External

Function:

This utility is used to set or check the Hard Disk writing mode.

Comments:

Issuing the HDMODE command without options returns the current status of the HDMODE byte within the memory image of the IOSYS. For performance reasons buffered mode is desirable; for data reliability during a system crash or application failure, direct mode is desirable. In buffered mode the data that is to be written to the Hard Disk is buffered internally to the APC system until data for a new track is required or 500 Milliseconds has elapsed since the last buffer flush. Once the write conditions are met, the entire track is written to the Hard Disk. In direct mode any logical write of a block (512 Bytes) is automatically translated into a track write operation and the dirty track buffer is written regardless of the track buffer's age. Use of HDMODE can impact the performance of the application and the choice of either buffered or direct mode should be made carefully. The default mode in the IOSYS is BUFFERED.

The change can be made permanent by selecting the /Perm option (permanent means that the IO.SYS file on disk is modified). The change is always made to the memory image of the IO.SYS unless the /Nomem option is used in the command line. Typing the command followed by no options will display the current state of the current Hard Disk writing mode.

RAMDISK Command

Syntax:

RAMDISK [on | off]

Type:

External

Function:

This utility is used to enable/disable the RAMDISK option within the IOSYS file.

Comments:

The RAMDISK Utility automatically introduces the "DEVICE = RAMDISK.SYS" phrase into the CONFIG.SYS file and sets the RAMDISK flag to "0FFH" when the "on" option is used. The "off" option will reverse the effects of the "on" option by removing the "DEVICE = RAMDISK.SYS" phrase from the CONFIG.SYS file and by setting the RAMDISK flag to 00H. The RAMDISK.SYS file which is distributed on the system diskette must be present on the same diskette that is used for booting the system. In order to activate/deactivate the RAMDISK, the system must be rebooted after the RAMDISK Utility has been executed. Using the RAMDISK utility without any option will report the current state of the RAMDISK option.

PRINTER

Syntax:

```
PRINTER [ <type> ] [ <parallel> | <serial> ] [ /Perm ] [ /Nomem ]
```

where:

```
<type>     is 8023, pinwriter, 7730, defspinwriter, 3530, or H16
<parallel> is /parallel, /even, /odd
<serial>   is /aux or /aux2
```

Type:

External

Function:

The PRINTER utility provides a method of defining the type of printer to be used with the APC system as the main printer.

Comments:

Internally there are several configurable values that the IOSYS uses to determine what type of printer is attached to the APC and which I/O device will be used to interface the printer. The printer utility allows the user to logically configure these IOSYS parameters according to printer type and interface type.

There are essentially two types of printers that can be used with the APC system: Serial interface or Parallel interface type. The type of printer that is identified as a part of the command syntax for the utility will fall into one of the two basic categories. In addition to setting the printer type, PRINTER also automatically adjusts the internal system parameters for `number of data bits` and `parity` as well as the type of `device connect checking to be performed`. The printer type byte in IOSYS is set according to the printer type that is selected. The table below shows the relationship between the printer type and the values that will be adjusted within the system.

PRINTER TYPE	IOSYS VALUE	DEVICE CONNECT CHECK	LENGTH IN BITS	PARITY SETTING
8023	04H	YES	8	None
PINWRITER	01H	YES	8	None
7730	00H	NO	7	Even
DEFSPINWRITER	00H	NO	7	Even
3530	00H	YES	7	Even
H16(8023)	04H	YES	8	None

As an alternative to using one of the standard printer selections, the command syntax allows the user to specify the type of printer options that are desired. The options only affect the parallel printer types and have no meaning for the serial printer types. The default values for the options are listed below.

OPTION TYPE PARALLEL	IOSYS VALUE	DEVICE CONNECT CHECK	LENGTH IN BITS	PARITY SETTING
/Parallel	00H	NO	8	None
/Odd	00H	NO	7	Odd
/Even	00H	NO	7	Even

Note:

Parallel options are to be used as an alternative to standard printer types. If used with an established printer type they will be disregarded.

OPTION TYPE SERIAL	IOSYS VALUE	DEVICE CONNECT CHECK	LENGTH IN BITS	PARITY SETTING
/Aux	C0H	--	-	----
/Aux2	80H	--	-	----

/Aux - Identifies the main serial interface port to the MSDOS system as the port to be referenced as the primary printer device.

/Aux2 - Identifies the optional H14 serial interface port to the MSDOS system as the port to be referenced as the primary printer device.

Note: Serial options are to be used as an alternative to standard printer types. They may also be used with the Pinwriter and defspinwriter printer types. Use with any other types will be disregarded.

For serial interface type printers the BAUD Rate/Number of Data Bits/Parity/Stop Bits must be setup by the SETCOM utility.

/Aux and /Aux2 are options that are used to identify the Serial interface port that is to be used by the MSDOS system as the serial interface port referenced as the primary printer device. The /Aux and /Aux2 options identify the main serial port and H14 optional serial interface port respectively.

The change can be made permanent by selecting the /Perm option (permanent means that the IO.SYS file on disk is modified). The change is always made to the memory image of the IO.SYS unless the /Nomem option is used in the command line. Typing the command followed by no options will display the current state of PRINTER.

SETFLOP

Syntax:

```
SETFLOP [1/2/3/4] [/Perm]
```

Type:

External

Function:

SETFLOP sets or checks the byte indicating the number of diskette drives on the system

Comments:

Issuing the command without parameters returns the current number of diskette drives in memory. A change is always made to memory.

/Perm - This option allows the user to make a permanent change to the IOSYS on disk in addition to changing the memory image

HDFORMAT Command

Syntax:

`HDFORMAT`

Type:

External

Function:

HDFORMAT is used to format and partition a hard disk.

Comments:

See the MSDOS User's Guide for complete information on the use of HDFORMAT. The following enhancements have been added with this release.

HDFORMAT now supports the Slave Hard Disk Drive (H-27). HDFORMAT now checks for the existence of both Hard Disk drives and then determines whether or not to provide a selection or automatically select the currently online Hard Disk Drive. If a selection is called for then the user is prompted to enter either a 0 or a 1. Entering a 0 selects the Master Hard Disk Drive (H-26) and entering a 1 selects the Slave Hard Disk Drive (H-27). The HDFORMAT Utility now automatically displays the volume information for the selected drive. When an update is performed, the currently selected drive is the one that is updated regardless of the operations that have been performed on the other Hard Disk Drive. Executing the Update option will not automatically exit the HDFORMAT session; an Exit option must be executed in order to terminate the HDFORMAT session. It is important to remember that HDFORMAT can Update a hard disk that is not of the MSDOS format (eg: CP/M-86 or CCP/M-86). If a message similar to the one below is displayed be very careful with the response that is given.

```
Drive # is probably NOT formatted as a MSDOS or p-System type:
Continuing will overwrite existing data if an update is done!

Type a <SPACE> to continue or <ESC> to exit:_
```

Note:

= 0 ----> Master Hard Disk Drive (H-26)
= 1 ----> Slave Hard Disk Drive (H-27)

Please refer to the MSDOS User's Guide for details on the use of HDFORMAT

GETSYS Command

Syntax:

```
GETSYS d: [/Hide]
```

Type:

External

Function:

Moves copies of the system files from one disk volume to another.

Comments:

GETSYS is a Utility that is used to copy the IO.SYS, MSDOS.SYS and COMMAND.COM files from a specified drive (d:) into the root directory of the current default drive. The GETSYS Utility is necessary since the IO.SYS, MSDOS.SYS and COMMAND.COM files may be hidden and therefore not transferrable with the COPY command.

Note:

d: indicates the drive from which to copy the .SYS files. The drive (d:) may be a diskette volume or a hard disk volume. The /Hide option will allow the user to make the copies of the system files into hidden files on the destination disk volume.

HDBACKUP Command:

Syntax:

```
HDBACKUP
```

Type:

External

Function:

The HDBACKUP utility allows MSDOS or P-System volumes to be backed-up and restored using double sided double-density (MSDOS Format) diskettes as the backup media.

Comments:

It is recommended that HDBACKUP be used periodically to make backups of the Hard Disk in order to protect against inadvertant loss of data due to hardware or software failures. HDBACKUP can be used to back-up or restore hard disk data for either hard disk unit 0 or 1 (Master or Slave Hard Disk respectively), or on a volume by volume basis.

The basic unit of space which may be backed up is the Hard Disk volume. A physical Hard Disk unit (master or slave) is partitioned as one to nine logical MSDOS or p-System volumes using the HDFORMAT Utility. (See the MSDOS User's Guide and this release bulletin for information on the operation of HDFORMAT.) These logical MSDOS volumes (partitions) may vary in size, depending on the number of tracks assigned to them by the user when HDFORMAT creates them. Depending on the size of a Hard Disk volume, one or more diskettes will be required to hold the backup data for the volume. Each back-up diskette will hold approximately one million bytes of backup data. A backup diskette never holds data from more than a single hard disk volume.

The backup diskettes created by HDBACKUP are not accessible as ordinary MSDOS volumes. They have a special format which is only recognizable to HDBACKUP. This means, for example, that you cannot use the DIR command to find out what is on a backup diskette. Nor can COPY be used to move an individual file to or from a backup diskette. If you wish to maintain backups of Hard Disk data on a file by file basis, you should use the MSDOS COPY command and formatted MSDOS diskettes. If you wish to produce additional copies of entire backup volumes, the MSDOS DISKCOPY command may be used.

Using HDBACKUP

The HDBACKUP utility is started by typing HDBACKUP at the MSDOS command prompt. The screen will clear, and the following prompt will appear:

```
            Hard Disk Backup/Restore Utility Options

            A) Back-up hard disk volume to diskette
            B) Back-up entire hard disk unit to diskette
            C) Restore hard disk volume from diskette
            D) Restore entire hard disk unit from diskette
            E) Display diskette backup information


      What chioce (A-E, Q to quit)?
```

Answer this prompt by typing one letter (no carriage return is necessary). The letter you type will select the operation to be performed. Typing A or B will select a back-up operation (data will be moved from the hard disk onto one or more diskettes). Typing C or D will select a restore operation (data will be restored onto the hard disk from one or more diskettes). Typing an E will allow you to determine the contents of a diskette previously created by HDBACKUP. Type a Q if you wish to quit the HDBACKUP Utility and exit to the MSDOS system prompt. Each of these operations are explained further in the following paragraphs.

Option A: Back-up hard disk volume to diskette

This operation allows you to save the contents of a single MSDOS Hard Disk volume (also sometimes called a partition). Since the Size of an MSDOS Hard Disk volume may vary, as determined when HDFORMAT created the volume, between one and ten diskettes will be required to hold the backup copy.

After typing A at the "Hard Disk Backup/Restore Utility Options" prompt, you will be asked to identify the hard disk volume to be backed up.

If you have two MSDOS Hard Disks units (APC H-26 and APC H-27) in your system, you will receive the following prompt:

```
            Select Hard Disk Unit

            A) Master (Unit 0)
            B) Slave (Unit 1)

      What choice (A-B, Q to quit)?
```

Select A if you wish to back-up a volume residing on the "master" Hard Disk (APC H-26), or B if the volume you desire to back-up resides on the slave Hard Disk (APC H-27) unit.

If you have a single Hard Disk unit (APC H-26 only) in your system, or if you have two Hard Disks units, but only one of them is formatted for use with MSDOS/p-System, then the appropriate unit will be selected automatically, and you will go directly to the next prompt item.

At this point, HDBACKUP will prompt for the specific volume desired within the selected Hard Disk unit: (for example, suppose the selected unit has been partitioned into 3 volumes called SYSTEM, DATA, and UTILS)

```
Make backup of Hard Disk Volume

A)  SYSTEM
B)  DATA
C)  UTILS

What choice (A-C, Q to quit)?
```

Type the letter corresponding to the Hard Disk volume you wish to back-up. For example, after receiving the example prompt above, you would type a C to indicate that you wish to back-up the UTILS volume.

Once you have selected the volume you wish to back-up, you will be prompted to provide a diskette to hold the first part of the backup data for the volume:

```
      Please insert a new diskette.  Press space bar to
      select use of drive A:, or drive letter to select
      another drive.
```

At this time, you should insert an MSDOS formatted, double sided double density diskette into one of the diskette drives. BE SURE THAT THE NEW DISKETTE DOES NOT CONTAIN VALUABLE DATA WHICH SHOULD NOT BE ERASED, AS THE BACK-UP OPERATION WILL OVERWRITE ANY PREVIOUS DATA CONTAINED ON THE DISKETTE! By default, HDBACKUP will attempt to use the most recently used diskette drive (or drive A:, if HDBACKUP has not yet used any diskette drive) as the drive for the backup diskette. If you are using this drive (A: in the example), type a space to begin the operation. If you have decided to use another drive, type the drive letter to instruct HDFORMAT to use that drive. For example, if you have mounted the diskette on drive B:, just type a B. No carriage return is necessary. If for any reason you wish to discontinue a back-up operation when asked for a new diskette, the ESC key will terminate the operation and return you to the "Hard Disk Backup/Restore Utility Options" prompt.

After you have mounted the diskette and indicated which drive to use, the back-up operation will begin. HDBACKUP will compute the number of diskettes required to hold the volume backup, and display some information about the operation in progress. For example, let's assume you are backing up a 280 track volume called UTIL. You would see the following screen as the operation begins:

```
Back-up of Hard Disk Volume

Diskette contains backup part 01 of 02 for hard disk
volume:

Name            : UTIL
System          : MSDOS
Backup Date     : 12/30/83
Backup Time     : 10:10:35
Starting Track  : 8
Ending Track    : 287

0%      Backup Diskette Used      100%
|                                  |
>
```

As the back-up operation progresses, HDBACKUP will add ">"s to the bottom line of the display, to indicate the amount of diskette space which as been used. Since this backup volume will be in two parts, data will continue to be transferred until 100% of the first diskette has been used, at which point the bottom part of the display will read:

```
0%      Backup Diskette Used      100%
|                                  |
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
```

When the last available space on the diskette has been filled, HDBACKUP will sound a short melody and re-prompt for another diskette to hold the second part of the backup. Again, the prompt will request that you mount a new diskette and then press a key to indicate which drive you are using. The default drive will now be the one used on the previous diskette. For example, if you had used drive B: for the first diskette of the backup volume, then the prompt will read:

```
Please insert a new diskette.  Press space bar to
select use of drive B:, or drive letter to select
another
```

It's okay to alternate between two diskette drives if you like - insert the disk into the drive which is not currently in use, and type the drive letter for that drive when HDBACKUP prompts for a new diskette. By doing so, you can save a little time because you will be able to insert the next diskette and remove the previous one while the actual back-up onto the other is taking place, thus keeping HDBACKUP busy for more of the time.

Once you have supplied the next diskette, the screen information on the current diskette will be updated, and the "Backup Diskette Used" display will reset to 0% before the backup operation for the second part of the volume begins.

The transfer of data from the Hard Disk to the diskette(s) will continue in this manner until all data for the volume has been copied to diskette. Note that the last diskette in a backup volume may not be 100% full when the back-up terminates. This is because Hard Disk units do not have to be partitioned into volumes which fit exactly into multiples of 1 diskette. This also means that it may require more than 10 diskettes to back-up all of the volumes on a Hard Disk unit, if the volumes were not set up to be multiples of a backup diskette in size. For this reason, you may wish to partition your volumes into sizes which are a multiple of 140 tracks (or 1820 "blocks".) A Hard Disk divided into multiples of 140 tracks will never take more than 10 diskettes to back-up.

When the volume back-up operation has completed, a different melody will sound, and HDBACKUP will return you to the "Hard Disk Backup/Restore Utility Options" prompt.

Option B: Back-up entire hard disk unit to diskette

Option B allows you to back-up every volume on a given Hard Disk unit. It accomplishes the same thing as would repeated use of option A (once for each partition on the Hard Disk unit). In operation it is almost identical with option A. The only difference between option A and option B is that you are never prompted for the volume to back-up. (You will, however, be prompted for the Hard Disk unit ("master" or "slave" drive) to back-up if both drives are present and contain MSDOS/p-System formatted data.) HDBACKUP option B will automatically perform a back-up operation for each volume stored on the Hard Disk unit, as if you had used option A for each volume. If at any time you wish to cancel the back-up operation, press the <ESC> key in response to the "Insert new diskette" prompt.

Option C: Restore hard disk volume from diskette

Option C allows you to restore the data onto the Hard Disk volume from a backup volume on diskettes that were created using options A or B.

After typing C, if you have two MSDOS hard disk units (APC H26 and APC H27) in your system, and both contain MSDOS/p-System volumes, you will receive the following prompt:

```
Select Hard Disk Unit

A) Master (Unit 0)
B) Slave  (Unit 1)

You choice (A-B, Q to quit)?
```

Select A if you wish to restore a volume residing on the "master" Hard Disk (APC H26), or B if the volume you desire to restore resides on the slave (APC H27) unit.

If you have a single Hard Disk unit (APC H26 only) in your system, or if you have two Hard Disk units, but only one of them is formatted for use with MSDOS/p-System, then the appropriate unit will be selected automatically, and you will go directly to the next prompt item.

At this point, you will be prompted to insert part 1 of the backup volume to be restored to hard disk:

```
Please insert a source diskette.  Press space bar to
select use of drive A:, or drive letter to select
another drive
```

As in options A and B above, HDBACKUP will default to using the most recently used diskette drive (or A: if no diskette drive has yet been used in HDBACKUP) as the drive containing the source (created by options A or B) diskette.

HDBACKUP will read identification information from the diskette to determine whether the diskette is a valid HDBACKUP source diskette, and if it is, what volume the source diskette contains. If the diskette is a valid HDBACKUP source diskette, then the identification information will be displayed in the following format:

```
Diskette contains backup part 01 of 02 for hard disk
volume:

Name           : VOLB
System         : MSDOS
Backup Date    : 12/30/83
Backup Time    : 10:10:35
Starting Track: 148
Ending Track   : 287
```

At this point, HDBACKUP will be looking for part 01 of a valid backup diskette volume. Furthermore, HDBACKUP will attempt to find a matching volume in the configuration information (as set by HDFORMAT) for the unit to be used. HDBACKUP does not, however, operate on a volume name basis; it attempts to find a hard disk volume of the same size and position (starting track and ending track) within the current configuration information for the target Hard Disk unit. If no such volume (partition) can be found, then HDBACKUP will display an error message:

```
This volume does not exist.  Restoration aborted.
Type <space> to continue.
```

and prompt for another source disk.

For example, lets say we have a Hard Disk unit partitioned into 3 volumes as indicated:

Volume name	Starting Track	Ending Track
VOLA	8	147
VOLB	148	287
VOLC	288	427

We also have a valid HDBACKUP diskette, which contains the following volume information:

Volume name	Starting Track	Ending Track	Part
FOOVOL	148	287	01 of 01

If we insert the FOOVOL diskette in response to the "insert source diskette" prompt, then HDBACKUP would proceed to copy the information from the FOOVOL diskette onto the Hard Disk volume called VOLB, because FOOVOL and VOLB have exactly the same starting track and ending track on the hard disk. The difference in names is ignored.

Say, however, we have another diskette with the following volume information:

Volume name	Starting Track	Ending Track	Part
VOLA	8	287	01 of 02

If we insert this diskette, we will get the "Volume does not exist" error from HDBACKUP. This is because there is no Hard Disk volume on the unit with the same starting and ending track as the VOLA backup diskette. The matching names (VOLA on the hard disk and VOLA on the diskette) are ignored by HDBACKUP. The name is recorded on the diskette ONLY to provide identification information to the user. (See option E below for instructions about examining volume information on a diskette).

Once HDBACKUP determined that the diskette contains valid data for a volume in the current Hard Disk unit configuration, it checks to make sure that the diskette contains part 01 of the data. If the part number in the volume identification information is not part one, then HDFORMAT will play a short melody and re-prompt for another source diskette.

With the part 01 diskette mounted in the selected diskette drive, HDBACKUP will begin the transfer of backup data from the diskette onto the Hard Disk unit. As in the back-up operations described above (options A or B), the diskette volume identification information will be displayed, along with an indication of diskette usage. The operation will continue until all of the information has been transferred from the diskette (the use indicator displays 100%), or until the restoration of the volume is complete.

If there are more diskettes remaining in the backup volume, then a short melody will be played upon completion of the current diskette, and you will be prompted to insert the next diskette. Again, as in the A or B options above, you may use a different diskette drive by mounting the next diskette in the desired drive and typing the drive letter to indicate your choice.

Each time HDBACKUP prompts for a new source diskette, it will check to make sure that the next diskette contains the proper part if it's volume identification information for the part of the volume currently being restored; if a diskette other than the next part for the volume in progress is provided, HDBACKUP will re-prompt for the correct part.

The restore operation continues in this fashion until the entire Hard Disk volume has been restored. After the final part completes, a short melody will be played to indicate that the operation is complete, and you will be returned to the "Hard Disk Backup/Restore Utility Options" prompt.

Option D: Restore entire hard disk unit from diskette

This option is exactly like the C option described above, except that you are not returned to the "Hard Disk Backup/Restore Utility Options" prompt when a volume restore has completed; rather, you are then prompted to insert another backup diskette, part 01 of the next Hard Disk volume to restore. After all desired volumes on the selected Hard Disk unit have been restored, press the <ESC> key to exit to the "Hard Disk Backup/Restore Utility Options" prompt.

Option E: Display diskette backup information

HDBACKUP records identification information on every diskette it writes in back-up operations. This information can be displayed with the E option.

After selecting E, you will be prompted to insert the diskette into a drive, and indicate which drive will be used:

```
Please insert a new diskette.  Press space bar to
select use of drive A:, or drive letter to select
another drive
```

Once you have done this, HDBACKUP will read the diskette to find its volume identification information. If HDFORMAT cannot find any valid information (for example, if you attempt to read the information on a normal [not created by HDBACKUP] MSDOS diskette), it will display:

```
Diskette contains no valid backup information
```

If the diskette is a valid backup diskette, then the identification information will be displayed in the following format:

```
Diskette contains backup part 01 of 02 for hard disk
volume:

Name            : UTIL
System          : MSDOS
Backup Date     : 12/30/83
Backup Time     : 10:10:35
Starting Track  : 8
Ending Track    : 287
```

The backup time and date indicates the time and date that the back-up operation for the volume which created the diskette started.

Note that the given starting and ending track numbers refer to the Hard Disk volume of which the diskette is a part, not to which tracks within a volume this diskette contains. In the example above, both parts 01 of 02 and 02 of 02 would contain the volume information of starting track : 8 and ending track : 287.

Extended IOSYS function #11: Optional RS-232 Functions.

Extended BIOS function #11 allows initialization of the optional expansion serial interface hardware (APC-H14). When calling this function, register CX must contain 11 (decimal). Additional parameters should be supplied as described in detail below. Once the required parameters have been set, the function is called by using the INT 220 (extended IOSYS function call) software interrupt.

Set Baud Rate and Mode

This function is used to initialize the expansion interface, by specifying baud rate, number of stop bits, parity, and character length.

Input

CX: 11 (decimal)
DL: 8251 mode (see below)
DH: baud rate (see below)

Output

none

8251 Mode

bit (msb)	7	6	5	4	3	2	1	0	
	0	0	x	x	x	x	1	0	invalid
	0	1	x	x	x	x	1	0	1 stop bit
	1	0	x	x	x	x	1	0	1 1/2 stop bits
	1	1	x	x	x	x	1	0	2 stop bits
	x	x	0	x	x	x	1	0	odd parity
	x	x	1	x	x	x	1	0	even parity
	x	x	x	0	x	x	1	0	parity disabled
	x	x	x	1	x	x	1	0	parity enabled
	x	x	x	x	0	0	1	0	5 data bits
	x	x	x	x	0	1	1	0	6 data bits
	x	x	x	x	1	0	1	0	7 data bits
	x	x	x	x	1	1	1	0	8 data bits

example:

0BE (hex) = 2 stop bits, even parity, 8 data bits

Baud Rate

Values for DH to set the corresponding Baud Rate

DH	Baud Rate
0:	150 bps
1:	200
2:	300
3:	600
4:	1200
5:	2400
6:	4800
7:	9600
8:	19200

example: DH = 6 --------> Baud Rate of 4800

bps -------> bits per second

GSX-86 P2 DRIVER

PURPOSE:

DONECP2.SYS is a GSX-86 compatible device driver that allows graphic output to be drawn on the P2/P3 Pinwriter (serial or parallel) printer. Any program that uses GSX graphic subroutine calls can now send graphic commands to the P2/P3 Pinwriter printer. Refer to the GSX-86 User's Guide for more information on these subroutine calls.

DRIVER SPECIFICATIONS:

FILENAME	DDNECP2.SYS
DEVICE INDEX	The actual device index for this device is determined in the ASSIGN.SYS file, which associates a device index with a GIOS module (device driver). We recommend that this number be in the range 21-38 for printers.
MAXIMUM BAUD RATE	9600 for serial interface P2/P3 Pinwriter
COMMUNCATIONS	Standard serial communications (RS-232C) or Parallel (centronix)
GRAPHIC INPUT (GIN)	The P2/P3 Pinwriter does not support graphic input.
TEXT	The printer supports 12 character sizes. Text can be rotated in 90 degree increments.
MARKERS	1 . 2 + 3 * 4 O 5 X
LINESTYLE	The printer has five hardware linestyles. Linestyle 1 is solid, and linestyles 2 - 5 are combinations of dashed and dotted lines.

COLOR

The P2 Pinwriter printer supports one color. All color indices are mapped to index 1 and are displayed.

GENERALIZED DRAWING PRIMITIVES (GDPS)

The available GDP and its identifier is:
1 - Bar

ESCAPES

The escape function available on the P2 Pinwriter printer is:
1 - Inquire addressable character cells

SUMMARY

The functions available in the P2/P3 Pinwriter printer GIOS are:

Opcode	Definition
1	Open workstation
2	Close workstation
3	Clear workstation
4	Update workstation
5	Escape
6	Polyline
7	Polymarker
8	Test
9	Filled area
10	Cell array
11	Generalized Drawing Primitive
12	Set character height
13	Set character up vector
15	Set polyline linetype
17	Set polyline color index
18	Set polymarker type
19	Set polymarker scale
20	Set polymarker color index
22	Set text color index
23	Set fill interior style
24	Set fill style pattern
25	Set fill color index